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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,782	07/28/2003	Tetsuya Kawanishi	240841US	5344
22850	7590	01/19/2006	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			LEE, JOHN D	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 01/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

11-A

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/627,782	KAWANISHI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	John D. Lee	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 November 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-3,5,7,9,11,13 and 15 is/are allowed.
- 6) ☒ Claim(s) 4 and 6 is/are rejected.
- 7) ☒ Claim(s) 8,10,12 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

Applicant's communication received on November 28, 2005, has been carefully considered by the Examiner. The amendments made therein have obviated the previously applied objections and rejections to the claims, and those objections and rejections are accordingly withdrawn. In response to the Examiner's specific request, an English translation of the Higuma et al reference has been provided. The Examiner appreciates applicant's cooperation in providing this translation. After a careful study of the English translation of Higuma et al, it is apparent that two of applicant's presented claims must be rejected as being unpatentable thereover. The rejections are set forth further below. The remaining pending claims are deemed allowable over the prior art of record. Since this is the first rejection based upon the Higuma et al reference, this action is *not* made final.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 4 is rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Higuma et al (TECHNICAL REPORT OF IEICE Mar. 2002, submitted by applicant). Applicant's date of application for patent in the United States is July, 28, 2003. As best seen in Figure 1 of the reference, Higuma et al discloses an optical frequency shifter (converter) which comprises (from left to right) a light wave input section, a modulation signal input section, and a modulated light wave output section. The Higuma et al modulation signal input section includes first and second paths comprising, respectively, first and second Mach-Zehnder interferometer type phase modulators which together

Art Unit: 2874

make up a single sideband, suppressed carrier (SSB-SC) modulator. First and second electrodes  $DC_A$  and  $DC_B$  respectively control the phases of the light waves propagating through the first and second Mach-Zehnder interferometer type phase modulators, while a third electrode  $DC_C$  controls the phase of the light waves propagating through each arm of the SSB-SC modulator. Electrodes  $RF_A$  and  $RF_B$  respectively apply predetermined microwave (RF) electric signals to the modulation signal input section, with the signals having a phase difference therebetween of  $\pi/2$  ( $90^\circ$ ). In Higuma et al, a noise component included in the output of the Mach-Zehnder interferometer type single sideband, suppressed carrier (SSB-SC) modulator generated by the phase difference between the two signals having the  $90^\circ$  phase difference is suppressed by adjusting the bias voltage applied to the third electrode  $DC_C$ . Higuma et al thus discloses the same optical frequency converter set forth in applicant's claim 4.

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Higuma et al (TECHNICAL REPORT OF IEICE Mar. 2002, submitted by applicant). Although Higuma et al discloses that electrodes  $RF_A$  and  $RF_B$  respectively apply predetermined microwave (RF) electric signals having a phase difference therebetween of  $\pi/2$  ( $90^\circ$ ), the means for splitting a microwave electric signal so as to achieve the  $90^\circ$  phase difference is not disclosed. Since the important aspect of this feature is the presence of the  $90^\circ$  phase differential, any known means for efficiently achieving it would have been

Art Unit: 2874

obvious. Therefore, the use of a  $90^\circ$  hybrid for creating the  $90^\circ$  phase difference between the signals produced by electrodes  $RF_A$  and  $RF_B$  would have been obvious to a person of ordinary skill in the art.

Claims 1-3, 5, 7, 9, 11, 13, and 15 are allowed. Higuma et al does not disclose or suggest an optical frequency converting device which produces a third-order lower-sideband or upper-sideband, and does not disclose or suggest means for modulating a light wave identical to the input light wave with a signal having an angular frequency that is three times that of the microwave electric signal. Higuma et al also does not disclose or suggest an optical frequency converting device which includes a circuit configured to generate a wave having a frequency that is triple a frequency of the fundamental wave, along with means for performing various operations upon the triple-frequency wave.

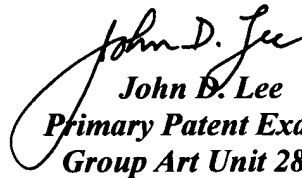
Claims 8, 10, 12, and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Higuma et al does not disclose or suggest that the predetermined microwave (RF) electric signals can originate from a microwave (RF) electric signal having a periodically changing frequency.

It is noted that no arguments or comments regarding the English translation of Higuma et al were offered by applicant in the communication received on November 28, 2005.

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (571) 272-2351. The Examiner's normal work schedule is Tuesday through Friday, 6:30 AM to 5:00 PM. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be

Art Unit: 2874

directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562, to the technical support staff supervisor (Team 8) at telephone number (571) 272-1564, or to the Technology Center 2800 Customer Service Office at telephone number (571) 272-1626.

  
**John D. Lee**  
**Primary Patent Examiner**  
**Group Art Unit 2874**